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He Said, She Said: Examining Parental Concordance on Home Environment Factors and Adolescent Health Behaviors and Weight Status

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Abstract

Introduction—Few studies have examined concordance/discordance between caregivers to identify whether caregivers see familial and parental factors in the home environment similarly or differently and whether the agreement or disagreement is related to adolescent obesity risk. Answers to these questions are important and may inform whether family-based childhood obesity interventions need to target both parents.

Objective—The main objective of the study is to examine whether and how parental concordance/discordance on factors in the home environment (e.g., importance of family meals, parent feeding practices, encouraging child physical activity, limit setting on child screen time) are associated with adolescent health behaviors and weight status.

Design—Data from two linked population-based studies were used in cross-sectional analyses. Linear regression models examined associations between parental concordance/discordance on home environment factors and adolescents' health behaviors and weight status.

Participant/Settings—Racially/ethnically and socioeconomically diverse adolescents (n=1,052; 54% girls; mean age = 14.3 years) and their parents (n=2,104; 52% female; mean age = 41.0 years) from Minneapolis and St. Paul, Minnesota participated in the study. Anthropometric assessments and surveys were completed at school by adolescents and surveys were completed at home by parents.

Results—Parental concordance on home environment factors was high for some factors (e.g., 68% concordance on not pressuring adolescent to eat) and low for other factors (e.g., 2% concordance on parent engaging in physically activity with child 4+ hours/week). Parental concordance on positive home environment factors (e.g., frequency of family meals) was associated with more adolescent healthful eating patterns and hours of physical activity ($p < 0.05$),

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but not consistently. When parents were discordant, adolescents had higher consumption of fast food and more unhealthy weight control behaviors ($p < 0.05$), but not consistently.

Conclusions—Results suggest there is some degree of parental concordance on home environment factors, however the results were inconsistent and approximately one third of parents were discordant on these factors. Future research is needed to further examine the role of parental concordance/discordance on adolescent health behaviors and weight status.

Keywords

Parent Concordance; Parent Discordance; Adolescents; Obesity; Dietary Intake; Physical Activity

INTRODUCTION

Recent research within the realm of childhood/adolescent obesity has aimed at increasing our understanding of the role of parents within the home environment and familial factors in increasing or decreasing childhood obesity risk.[1–5] Parent feeding practices,[6–9] frequent family meals[10–14] and parent modeling and encouraging of healthful behaviors[15–17] have all been examined in relation to childhood obesity risk. Results have suggested that restrictive parent feeding practices are associated with increased obesity risk,[6–9] while parent modeling and encouraging of healthful behaviors and frequent family meals are often associated with lower body mass index (BMI),[13,14,17–19] although findings have not always been consistent.[20] However, the majority of previous studies have used a "primary parent," most often the mother, to report on the home environment.[1,2,21] Very few studies have gathered reports from both parents and fewer studies have looked at concordance and discordance between parents to identify whether parents see familial (e.g., frequency of family meals, support for physical activity) and parental factors (e.g., parent feeding practices, modeling physical activity) in the home environment similarly or differently. Examining the impact of parental agreement or disagreement on key home environment factors related to child weight and health behaviors will be useful for informing the creation of future interventions to address childhood obesity.[1,21]

Given the high prevalence of adolescent obesity and its negative health consequences,[22–24] it is important to know if parents see familial and parental factors in the home environment the same way to inform data collection and family-based interventions. If both parents agree on these elements of the home environment it may be adequate to collect data from one parent, thus increasing the cost effectiveness of data collection. Additionally, intervening with one parent may be adequate for change within the home environment. However, if parents disagree on familial and parental factors in the home environment, or they agree on aspects of familial and parental factors in the home environment that are linked with negative health outcomes in adolescents (e.g., restrictive feeding practices and increased disordered eating behaviors in youth),[4,7,25] it would be important to gather data from both parents. For example, if parents disagree (i.e., discordance) on whether they should encourage their child to be physically active, it may give mixed messages to the child about the importance of engaging in physical activity themselves. If the parents both agree (i.e., concordance) that they engage in food restriction with their child, the child may be exposed to more food restriction overall which may put them at even higher risk of unhealthy weight

control behaviors. Thus, a comprehensive picture of the home environment may help to understand whether public health interventions need to intervene with both parents in order to decrease adolescent obesity risk.

Examining dyadic concordance or discordance between parents is consistent with Family Systems Theory,[26,27] which purports that the family environment is the most proximal level of influence on adolescents' weight and health behaviors. This theory indicates that agreement or disagreement between multiple family members' beliefs, perceptions and behaviors regarding weight and health behaviors may influence youths' own weight and health behaviors for better or for worse. Specifically, if there is concordance between the parental dyad about positive familial and parental home environment factors (e.g., importance of family meals, being physically active with the child), then it is expected that adolescents will be more likely to engage in healthy behaviors (e.g., have more frequent family meals, be more physically active). However, if parents are concordant on home environment factors that are negative, such as both parents agreeing that they engage in food restriction with their child, it is expected that children will engage in more unhealthy behaviors (e.g., unhealthy weight control behaviors). Additionally, if there is discordance between the parental dyad about familial and parental factors in the home environment, then it is expected that adolescents will be more likely to engage in unhealthy behaviors (e.g., more fast food consumption, more sedentary behavior). For example, if one parent consumes fast food and sugar-sweetened beverages, but the other parent does not, these mixed messages may make it difficult for the child to eat healthfully.

Thus, the current study will describe how two parents perceive familial and parental factors in the home environment and will examine the association between parental concordance and discordance on familial and parental factors in the home environment and adolescent weight and health behaviors. The two main research questions include: (1) Do parents agree on familial and parental factors in the home environment, including how frequent family meals occur, importance of family meals, rules around media use at family meals, parent feeding practices, support for physical activity, and sedentary behaviors?; and (2) Is parental concordance on familial and parental factors in the home environment associated with more positive adolescent health behaviors (i.e., more fruit and vegetable intake and physical activity and less fast-food consumption, unhealthy weight control behaviors, and sedentary behavior) and lower BMI percentile?

METHODS

Study Design and Population

Data for this cross-sectional analysis were drawn from two linked, population-based studies. EAT 2010 (Eating and Activity in Teens) was designed to examine dietary intake, physical activity, weight control behaviors, weight status and factors associated with these outcomes in adolescents.[28–30] Project F-EAT (Families and Eating and Activity Among Teens) was designed to examine factors within the family and home environment of potential relevance to weight and weight-related behaviors in youth.[29] All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and the participating school districts.

For EAT 2010, surveys and anthropometric measures were completed by 2,793 adolescents from 20 public middle schools and high schools in the Minneapolis/St. Paul metropolitan area of Minnesota during the 2009–2010 academic year. Eligibility criteria for adolescents included being in middle or high school in one of the 20 Twin Cities public schools and speaking English. Adolescents were given the opportunity to assent to the study if their parent/guardian returned a signed consent form approving the child's participation. Among adolescents who were at school on the days of survey administration, 96.3% had parental consent and chose to participate. The mean age of the study population was 14.4 years (SD=2.0). Forty-seven percent of the adolescents were boys and 53% were girls. The racial/ethnic backgrounds of participants were as follows: 18.9% white, 29.0% African American or Black, 19.9% Asian American, 16.9% Hispanic, 3.7% Native American, and 11.6% mixed or other. The annual household income of participants in the EAT 2010 study included: 39% earning < $35,000 per year, 22% earning between $35,000–49,999 per year, 17% earning between $50,000–79,999 per year, 14% earning between $80,000–99,999 per year, and 8% earning >$100,000 per year.

For Project F-EAT, data were collected by surveying up to two parents/caregivers (n=3,709) of the adolescents in EAT 2010 by mail or phone interviews. Adolescent participants in the EAT 2010 study (n=2,793), were asked to identify up to two parents or guardians; 30% provided contact information for one parent/guardian and 70% provided information for two parents/guardians. Eligibility criteria for parents included having an adolescent in the EAT 2010 study and speaking English. Parents consented for participation in the study via sending in their completed survey. In total, 2,382 EAT 2010 (85.3%) adolescent participants had at least one parent respond and there were two parent respondents for 1,327 adolescents. Parent participants had a mean age of 42.3 years (SD=8.6). The majority of parent respondents were mothers or other female guardians (62.0%). Participating parents of adolescents were ethnically and socioeconomically diverse, similar to the adolescent sample.[29]

For the current analysis, we included only those adolescents who had two parents respond to the parent survey, both of whom reported living with the adolescent 100% of the time. This allowed for examination of concordance and discordance within parent dyads who have a higher likelihood of having a consistent influence on their child throughout a typical week. The final sample included 1,052 children with a mean age of 14.3 years (SD=1.9), 54% female, 25% White, 17% African American or Black, 21% Hispanic, 25% Asian American and 11% Native American/Hawaiian/Mixed/Other. The final sample of parents (N=2,104; parents of 1052 children) included 49% mothers, 1% step-mothers, 1% other females (grandmother, aunt, roommate), 42% fathers, 4% step-fathers, 1% other males (grandfather, uncle, roommate), and 2% other (friend). The mean age of parents was 41.0 (SD=8.0).

Survey Development

The EAT 2010 student survey[31] and F-EAT parent survey[29] are self-report instruments that assess a range of factors of potential relevance to the weight status and weight-related behaviors of adolescents and parents. Survey development was initially guided by a review of pre-existing instruments and surveys in the field of adolescent obesity[32,33] and a

theoretical framework which integrates Family Systems Theory,[26,27] Social Cognitive Theory,[34] and Socio-Ecological Theory.[35] Drafts of the surveys were pre-tested by 56 adolescents and 35 parents from diverse backgrounds for clarity, readability and relevance; and each survey was reviewed by an interdisciplinary team of experts. After revisions, each survey was additionally pilot tested with separate samples of 129 middle school and high school students and 102 parents to examine the test-retest reliability of measures over a one-two week period. Reliability results were used to make final changes to the survey.

Measures

All exposure variables (i.e., family eating environment factors, family physical activity environment factors), outcome variables (i.e., adolescent BMI percentile, fruit and vegetable intake, fast food consumption, unhealthy weight control behaviors, physical activity, sedentary behavior) and covariates including child's age, sex, race/ethnicity, highest parental education attainment of either parent, and each parent's BMI are described fully in Table 1. All exposure variables and parent's BMI were collected from information in the F-EAT survey. All information about adolescents, including outcome variables and demographic characteristics, were collected from survey questions in the EAT 2010 questionnaire. Based on previous research,[1,2,4,48] exposure variables were grouped into positive or negative familial/parenting home environment factors. Positive factors were frequency of family meals, importance of family meals, limiting media at family meals, engaging in physical activity with child, and helping the child be physically active. Negative factors included restriction and pressure-to-eat feeding practices, adolescent use of media at family meals, and watching TV with the child.

Parental concordance/discordance between the exposure variables of interest (Table 1) was defined as a three-level categorical variable: both parents endorsed the behavior/characteristic (i.e., concordance); neither parent endorsed the behavior/characteristic (i.e., concordance); or they disagreed (i.e., discordance). For example, if both parents reported they set limits on their child's use of media during meals, they were categorized as "Both Parents Endorse Agree", or concordant, on the media use exposure variable. For variables with multiple categories (e.g. Never/Sometimes/Always), parental concordance was defined as both parents endorsing the same level. Parental discordance was then defined as any disagreement between the parents on the level of the given exposure variable. Thus, "concordance" represents parents who either both agreed or both disagreed with statements about familial and parental factors in the home environment. "Discordance" represents when one parent agreed with the statements about familial and parental factors in the home environment and the other parent disagreed with the statements.

Statistical Analysis

Descriptive statistics including means, frequencies, and percentages were computed for all variables. Distributions of variables were assessed for any extreme values and outliers; none were found. Continuous outcome variables measuring adolescent weight and health behaviors (i.e., daily servings of fruits and vegetables, frequency of weekly fast food consumption, hours of physical activity per week, hours of sedentary behavior per week, BMI percentile) were modeled using separate linear regressions for each dependent variable.

Parental concordance was included in the models using indicator variables to estimate the independent association of each type of parental concordance (both parents endorse and neither parent endorses) relative to discordant parents. Unhealthy weight control behaviors, a dichotomous outcome variable, was modeled using logistic regression. Adjusted means were calculated from the linear regression models and predicted probabilities (adjusted percents) were calculated from logistic regression models.[40] Differences in the means and adjusted probabilities of the adolescent outcomes between the concordance levels were also estimated. All models were adjusted for child's sex, age, race/ethnicity, socio-economic status (i.e., the highest education level of either parent; Table 1), and each parent's BMI (kg/m^2). Potential interactions between (1) parent sex and parental concordance and (2) child sex and parental concordance on home environment factors and adolescent outcomes were investigated. No statistically significant interactions were found between parent or adolescent sex and parental concordance in their associations with home environment factors and adolescent outcomes; final models did not include an interaction term.

Regression models were evaluated for instability in the regression coefficients to determine if substantial collinearity was present in the independent variables. No collinearity was observed among independent variables. A p-value < 0.05 was considered statistically significant. All analyses were conducted using Stata (version 13.1, StataCorp, 2013).

RESULTS

Descriptive Results

There were both low to high parental concordance (range=2%–68%) and low to moderate parental discordance (range=19%–36%) across family eating and physical activity home environment factors (Tables 2 and 3). The majority of parent dyads were concordant on factors that have been found to be protective against childhood obesity in previous research.[1,2,4] For example, 63% of parent dyads agreed that they set limits on media use during family meals, 68% of parent dyads reported that they didn't restrict or pressure their child to eat, and 46% of parent dyads agreed that they engaged in physical activity (1/2–4 hours/wk.) with their child. The only exception was concordance on family meals, in which 42% of parent dyads disagreed that family meals were important.

Approximately 20% of parents disagreed, or were "discordant", on aspects of the family eating environment and approximately 30% disagreed on aspects of the family physical activity environment (Tables 2–3). For example, in 26% of parent dyads one parent agreed that family meals were important and one disagreed. In 35% of parent dyads, one parent agreed that they helped their adolescent to be physically active and one parent disagreed.

Parental Concordance or Discordance on Familial and Parental Home Environment Factors and Adolescent Dietary Intake

Adolescent fruit and vegetable intake—Adolescents generally reported a higher intake of fruits and vegetables per day when parents were concordant on positive familial and parental home environment factors, compared to adolescents whose parents were concordant on negative home environment factors (Table 4). For example, when both

parents agreed that they engaged in frequent family meals, adolescents consumed almost three servings of fruits and vegetables per day, as compared to two and a half servings of fruits and vegetables consumed by adolescents whose parents both agreed that family meals occurred less often ($p < 0.05$). Additionally, adolescents whose parents were discordant on certain familial and parental home environment factors (i.e., at least one parent agreed to positive familial and parental home environment factors or disagreed to negative factors) had a higher intake of fruits and vegetables per day than those whose parents were concordant about negative factors (Table 4). For example, when at least one parent agreed that family meals were important, adolescents had almost three servings of fruits and vegetables per day, as compared to two and a half servings of fruits and vegetables consumed by adolescents whose parents both endorsed that family meals were not important. There were no significant associations between parental concordance or discordance on parental food restriction or pressure-to-eat feeding practices and adolescent fruit and vegetable intake. Additionally, there were few significant differences between discordant and concordant parents on positive home environment factors and adolescent fruit and vegetable intake.

Adolescent fast food consumption—Adolescents generally reported a higher consumption of fast food if parents were concordant on negative familial and parental home environment factors, compared to adolescents whose parents were concordant or discordant on positive home environment factors (Table 4). For example, parents who both agreed that family meals were not important had adolescents who reported consuming more fast food compared to adolescents whose parents both agreed that family meals were important (1.58 vs 1.20 times per week, $p < 0.05$), or when at least one parent thought family meals were important (1.58 vs 1.33 times per week, $p < 0.05$). Adolescents whose parents were discordant on setting limits on media use during family meals reported eating fast food almost two times per week compared to children whose parents both agreed that they set limits on media use during family meals (i.e., 1.92 vs 1.27 times per week; $p < 0.05$), or both disagreed that they set limits on media during meals (i.e., 1.92 vs 1.29 times per week, $p < 0.05$). There were no significant associations between parental concordance or discordance on parental food restriction or pressure-to-eat feeding practices and adolescent fast food consumption.

Adolescent unhealthy weight control behaviors—Among adolescents, 51% reported engaging in unhealthy weight control behaviors when both parents agreed that they engaged in food restriction parent feeding practices compared to 36% adolescents who engaged in unhealthy weight control behaviors when both parents agreed that they did not engage in food restriction (Table 4) ($p < 0.05$). Additionally, adolescents engaged in more unhealthy weight control behaviors when their parents were discordant on certain positive familial and parental home environment factors. For example, 47% of adolescents reported engaging in unhealthy weight control behaviors when one parent reported having less frequent family meals and the other parent reported having frequent family meals, compared to 34% of adolescents who reported engaging in unhealthy weight control behaviors when both parents agreed that they had frequent family meals. There were no significant

associations between parental concordance or discordance on parent limit setting or parent pressure-to-eat feeding practices and adolescent unhealthy weight control behaviors.

Parental Concordance or Discordance on Familial and Parental Home Environment Factors and Adolescent Physical Activity

Adolescent physical activity—Adolescents reported engaging in more hours of physical activity per week when parents reported concordance on positive familial and parental home environment factors (Table 5). For example, when both parents agreed that they frequently helped their child be physically active, adolescents engaged in significantly ($p < 0.05$) more hours of physically activity per week (9.3 hrs./week), relative to any other concordant or discordant categories.

Adolescent sedentary behaviors—Adolescents reported engaging in more hours of sedentary behaviors when both parents agreed that they watched TV/movies frequently (i.e., 4+ hrs./week) with their adolescent (46.4 hours vs. 38.4; $p < 0.05$), than when both parents endorsed ½–4 hours; however, differences between other concordance/discordance categories were not statistically significant (Table 5).

Parental Concordance or Discordance on Familial and Parental Home Environment Factors and Adolescent BMI

There were few significant differences between parental concordance or discordance on home environment factors and adolescent BMI (Table 6). However, one significant finding showed that when both parents reported engaging in food restriction parent feeding practices, adolescents had higher BMI percentile ($p < 0.05$) compared to parents who both reported not engaging in food restriction feeding practices. Additionally, adolescents whose parents were discordant on limit setting of adolescent's media use during family meals (i.e., at least one parent agreed they set limits and one parent disagreed they set limits) had lower BMI percentile ($p < 0.05$) compared to adolescent's whose parents were concordant on limit setting (i.e., both parents agreed they did set limits; both parents agreed they did not set limits). There were no significant associations between parental concordance or discordance on family physical activity factors (i.e., parent supporting and engaging in physical activity with child) or family meal factors (i.e., importance of family meals, frequency of family meals, and frequency of adolescent media use at family meals) and adolescent BMI.

DISCUSSION

There were three main overall findings from this population-based, cross-sectional study. First, parental concordance ranged from low to high (i.e., 2–68%) and parental discordance ranged from low to moderate (i.e., 19–36%) across family eating and physical activity home environment factors. Thus, given the variable range of parental concordance and discordance on familial and parental factors in the home environment of importance to childhood obesity, it may be premature to suggest that one parent is adequate for reporting on the home environment or that interventionists can target only one parent in childhood obesity prevention interventions. For example, several significant findings showed that parental discordance on familial and parental factors was associated with both positive and

negative adolescent dietary patterns (e.g., fruit and vegetable intake, fast food consumption, unhealthy weight control behaviors). Thus, both parents' report may be needed to determine parental influence on specific adolescents' health behaviors and BMI.

Second, results from the current study showed that when parents were concordant on familial and parental factors in the family eating and physical activity environments (for both positive and negative home environment factors), the results supported existing literature showing that these specific factors are protective for adolescent obesity.[1–5] For example, when both parents agreed that family meals frequently occurred in the home, adolescent fruit and vegetable intake was significantly higher compared to parents who both disagreed that family meals occurred. Additionally, when parents were concordant on not using restrictive parent feeding practices, adolescents had significantly lower BMI percentiles. These findings corroborate the evidence in the field showing significant associations between parental practices (e.g., frequent family meals, setting limits on media during family meals, importance of family meals, using non-restricting parent feeding practices) and adolescents' weight and health behaviors.[48,50,51]

Third, results from the current study indicated that when parents were discordant on familial and parental factors in the home environment, sometimes the association with adolescent health behaviors was positive and other times it was negative, indicating that when at least one parent is engaging in the parenting behavior (whether positive or negative) adolescents' health behaviors may be influenced. For example, when one parent endorsed the importance of family meals and the other parent did not, adolescents' engaged in more unhealthy weight control behaviors compared to parents who both agreed family meals were important. This finding may indicate that inconsistent messages between parents influence adolescents to choose less healthful options. However, results also showed that when one parent endorsed the importance of family meals and the other parent did not, adolescents ate more fruits and vegetables as compared to parents who both disagreed that family meals were important. This finding may imply that if at least one parent is supporting/reinforcing healthful attitudes, the adolescent may engage in healthful behaviors.

The study had several strengths and some limitations. One strength of the study was the large, ethnically/racially and socio-economically diverse population, allowing for generalization of findings to similar populations. In addition, independent reports were collected from mothers, fathers and adolescent children, which has rarely been done. Furthermore, there was a high survey response rate by participants, several characteristics of the family eating and physical activity environments were measured, and adjustments were made for possible third variable confounding of results (age, parent education, race/ethnicity, parent BMI). One limitation of this study is the cross-sectional design. Because we were unable to examine longitudinal associations, we cannot determine temporality of associations. Additionally, other important familial and parenting factors may need to be assessed such as, parenting style and family functioning in order to obtain a more complete assessment of the home environment.

CONCLUSIONS

Results from the current study suggest that there is some degree of parental concordance on family eating and physical activity environments, however the results were inconsistent and approximately one third of parents were discordant on familial and parenting factors in the home environment of importance to adolescent dietary intake, physical activity and weight status. Thus, it may be too soon to provide a conclusive statement regarding whether one parent's perspective of the home environment is adequate for data collection or if targeting one parent in childhood obesity prevention interventions is sufficient. Additionally, results indicated that the association between parental concordance or discordance on familial and parenting factors in the home environment and adolescent dietary patterns, physical activity/sedentary behaviors and BMI was health promoting in some situations and not health promoting in others. Thus, future research should be carried out to determine whether and how parental concordance or discordance is related to adolescent weight and health behaviors. Furthermore, registered dietitians and health care providers who work with adolescents and their parents may want to gather both parents' perspectives of familial and home environment factors when targeting adolescent obesity prevention in order to not miss important parental perspectives of the home environment that are associated with adolescent health behaviors and weight status.

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Table 1

Exposure, Outcome and Control Variables used in Analyses with Sociodemographically Diverse Adolescents and Parents

Measure	Description/Questions
Family Eating Environment and Family Physical Activity Environment (Exposure Variables):	
Family Eating Environment (parent report)	
Importance of Family Meals	• Mealtime importance was assessed with the following 4 items: "It is important that our family eat at least one meal a day together" (reverse scored); "Different schedules make it hard to eat meals together on a regular basis"; "In our family, it is often difficult to find a time when family members can sit down to a meal together"; and "In our family, children are expected to be home for dinner" (reverse scored). Response options were on a 4-point Likert scale ranging from strongly disagree to strongly agree. • Scores were dichotomized at the sample median (M=9) with lower scores on the meal importance scale reflecting greater importance on mealtimes (two-week test-retest r=0.72[a])
Frequency of Adolescent Media Use at Meals	• Electronic media use at mealtimes was examined with five items in which parents reported the frequency with which their adolescent engaged "watching TV or movies," "playing with hand-held games," "talking on the phone," "text messaging," or "listening to music with headphones" during family meals. Response options included 'never or rarely,' 'sometimes,' 'usually,' and 'always' (item test-retest correlations=0.61 to 0.75). • A summary measure was created and dichotomized at the sample median (M=6) with lower scores reflecting never/rarely using electronics during meals.
Parent Limit Setting on Media Use at Family Meals	• Rules regarding mealtime media use was assessed with "Do you set limits (have rules, including no use) on your child's media use (TV, cell phone, texting, etc.) at family meals?" (yes/no; test-retest r=0.87[a]).
Frequency of Family Meals	• Parents were asked, "During the past seven days, how many times did all, or most, of your family living in your house eat a meal together?" Response options included: never, 1–2 times, 3–4 times, 5–6 times, 7 times, and more than 7 times (Test-retest r=0.83[a]).[36] • The three highest categories were collapsed to allow for meaningful comparisons between parents who had infrequent or occasional family meals with families who had more regular family meals.[37]
Parent Pressure-to-Eat	• Pressure-to-eat food-related parenting practices were measured using all four items from the Pressure-to-Eat Subscale of the Child Feeding Questionnaire (CFQ).[6] Self-report items included: 1) "My child should always eat all the food on his/her plate," 2) "I have to be especially careful to make sure my child eats enough," 3)"If my child says, "I'm not hungry, I try to get him/her to eat anyway," and 4) "If I did not guide or regulate my child's eating, my child would eat much less than he/she should." Individual items were measured using a 4-point Likert scale, with each point on the scale represented by a word anchor (disagree, slightly disagree, slightly agree, and agree). • Parent agreement with a particular statement was defined as a response of slightly agree or agree. An *overall parental pressure-to eat* scale was created by averaging responses to each of these four questions to assign an overall pressure score ranging from 1 (low pressure) to 4 (high pressure) and dichotomized at the 75th percentile (P_{75}=2.75) with lower scores reflecting no pressure. (Test-retest r= 0.73[a], Cronbach's alpha = 0.70).
Parent Restriction of Eating	• Restrictive food-related parenting practices were measured using six items from the eight-item Restriction Subscale of the CFQ.[6] The six self-report items included:1) "I have to be sure that my child does not eat too many high fat foods," 2)"I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries)," 3) "I have to be sure that my child does not eat too much of his/her favorite foods,"4) "If I did not guide or regulate my child's eating, he/she would eat too much of his/her favorite foods," 5) "I intentionally keep some foods out of my child's reach," and 6) "If I did not guide or regulate my child's eating, he/she would eat too many junk foods."

Measure	Description/Questions
	Individual items were measured using a 4-point Likert scale, with each point on the scale represented by a word anchor (disagree, slightly disagree, slightly agree, and agree). • Parent agreement with a particular statement was defined as a response of slightly agree or agree. An *overall parental restriction* scale was created by averaging responses to each of these six questions to assign an overall restriction score ranging from 1 (low restriction) to 4 (high restriction) and dichotomized at the 75th percentile (P_{75}=3.2) with lower scores reflecting no restriction. (Test-retest r= 0.72[a], Cronbach's alpha = 0.86).
Family Physical Activity Environment (parent report)	
Frequency of physical activity with child	• Frequency of parents engaging in physical activity with their child was assessed with the following questions,[38] "In a typical week, how many hours do you spend: [None, Less than ½ hour, ½ – 2 hours, 2 ½ – 4 hours, 4 ½ – 6 hours, 6+ hours} Being physically active with your child (e.g., throwing a ball around, taking a walk or bike ride together)?" • Three categories were creating with the first level being the "Never" category, then collapsing the next three levels (Less than ½ hour – 4 hours) into "Sometimes", and collapsing the highest two levels (4 ½ – 6+ hours) to "Often". (Test-retest r=0.58[a]).
Frequency of helping child be physically active	• Frequency of parents helping their child to be physically active was assessed by asking,[39] "In a typical week, how many hours do you spend: [None, Less than ½ hour, ½ – 2 hours, 2 ½ – 4 hours, 4 ½ – 6 hours, 6+ hours] helping your child to be physically active (e.g., driving them to the gym or sport practice, watching them play a sport)?" Three categories were creating with the first level being the "Never" category, then collapsing the next three levels (Less than ½ hour – 4 hours) into "Sometimes", and collapsing the highest two levels (4 ½ – 6+ hours) to "Often". (Test-retest r= 0.62[a])
Frequency of watching TV with child	• Frequency of parent watching TV with their child was assessed by asking,[39] "In a typical week, how many hours do you spend: [None, Less than ½ hour, ½ – 2 hours, 2 ½ – 4 hours, 4 ½ – 6 hours, 6+ hours] watching TV/movies together with your child?" • Three categories were creating with the first level being the "Never" category, then collapsing the next three levels (Less than ½ hour – 4 hours) into "Sometimes", and collapsing the highest two levels (4 ½ – 6+ hours) to "Often". (Test-retest r= 0.53[a])
Adolescent Dietary Intake, Fast Food Consumption, Weight Control Behaviors, Physical Activity, Sedentary Behaviors, BMI (Outcome Variables):	
Adolescent fruit/vegetable intake	• Dietary intake was assessed in EAT 2010 adolescents with the 149-item Youth and Adolescent Food Frequency Questionnaire (YAQ).[40] For fruit and vegetable intake, daily servings were defined as the equivalent of one-half cup. Validity and reliability of the YAQ have been previously tested with youth and found to be within acceptable ranges for dietary assessment tools.[40,41] • Responses to questions on the frequency of intake of fruits (n=14; excluding fruit juice) and vegetables (n=20; excluding french fries), were summed to assess average total daily intake.
Adolescent frequency of eating at a fast-food restaurant	• Adolescent fast food intake was assessed with the question: "In the past week, how often did you eat something from a fast food restaurant (McDonald's Burger King, Hardee's, etc.)?" • Response options were never, 1–2 times 3–4 times, 5–6 times, 7 times and more than 7 times. Responses were scored as: 0, 1.5, 3.5, 5.5, 7 and 9 times/week (Test-retest r = 0.38).
Adolescent Unhealthy Weight Control Behaviors	• Adolescent unhealthy weight control behaviors (UWCBs) were assessed with the question, "Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?": (1) fasted, (2) ate very little food, (3) used a food substitute (powder or a special drink), (4) skipped meals, and (5) smoked more cigarettes. • UWCBs was coded as a dichotomous variable (presence of any behavior versus none), based on our previous research.[42], Test-retest reliability was high for UWCBs (85%).

Measure	Description/Questions
Adolescent physical activity	• Physical activity questions were adapted from the Godin Leisure-Time Exercise Questionnaire.[43] EAT 2010 adolescents were asked: "In a usual week, how many hours do you spend doing the following activities: (1) strenuous exercise (e.g. biking fast, aerobics, jogging, basketball, swimming laps, soccer, rollerblading) (2) moderate exercise (e.g. walking quickly, easy bicycling, volleyball, skiing, dancing, skateboarding, snowboarding)." • Response options ranged from "none" to "6+ hours a week". (Test-retest r = 0.73). Items were summed together to assess average hours of moderate and vigorous physical activity per week.
Adolescent sedentary behavior	• Adolescents were asked, "In your free time on an average weekday (Monday-Friday), how many hours do you spend doing the following activities?…[hours = 0, ½, 1, 2, 3, 4, 5+]."[15] The activities assessed included: Watching TV/DVDs/videos, Using a computer (not for homework), and Xbox/Play-Station/other electronic games that you play when sitting (Test-retest r = 0.84). This same question was asked for weekends (Test-retest r = 0.77). • For each sedentary behavior an "hours per week" variable was created by multiplying the weekday hours per day by 5 and adding it to the weekend hours per day multiplied by 2. Students who reported 5+ hours of use were coded as having 6 hours. Total sedentary behavior per week was calculated as the sum of the three individual behaviors per week.
Adolescent Body Mass Index (BMI) percentile	• Height and weight measurements were taken at school by trained research staff in a private area with standardized equipment and procedures. Adolescents were asked to remove shoes and outerwear (e.g., heavy sweaters). • BMI values were calculated according to the following formula: weight (kg)/height (meters)^2 and converted to percentiles, standardized for sex and age based on CDC guidelines.[44,45]
Covariates:	
Sociodemographic characteristics	Adolescents' and parents' race/ethnicity, age, sex and parents' educational attainment were assessed by self-report in adolescents and parents respectively. • Race/ethnicity was assessed with the item, "Do you think of yourself as 1) white, 2) black or African-American, 3) Hispanic or Latino, 4) Asian-American, 5) Hawaiian or Pacific Islander, or 6) American Indian or Native American?," and respondents were asked to check all that apply. Participants who checked "white" and another option were included in the "other" category. Those who checked two non-white options were categorized as "mixed/other race". Additionally, those checking "Hawaiian/Pacific Islander" or "American Indian/Native American" were also categorized as "mixed/other race" due to their small numbers in this dataset. • Highest level of parent educational attainment was used as a proxy for socio-economic status. This has been done in our prior papers using the F-EAT sample as well, based on previous research suggesting this is a good indicator of SES.[46,47] Highest level of parent education attainment was assessed using the following question, "What is the highest level of education that you have completed?". Response options included: less than high school, high school/GED, vocational/technical school, associate degree, bachelor degree, graduate or professional degree. • Parent and adolescent age was calculated using self-reported birth date and survey completion date. • Parent and adolescent sex was assessed with the item, "Are you…[male/female]?" • Parent BMI was assessed using parent self-report of height and weight (Test-retest r =0.97[a]). BMI was calculated using the standard formula, weight (kg)/height (meters)^2 and taking the average between both surveys filled out for siblings.

[a] r = correlation coefficient of test-retest reliability.

Table 2

Parental Concordance/Discordance on Characteristics of the Family Eating Environment (n=1,052 pairs) within Sociodemographically Diverse Households.[a]

		Parental Concordance		Parental Discordance
	N	Both Parents Endorse Disagree	Both Parents Endorse Agree	Any Discordant
Importance of Family Meals	1,006	42% (419)	32% (319)	26% (268)
Parent Sets Limits on Adolescent's Media Use During Family Meals	975	17% (167)	63% (611)	20% (197)
Parent Pressures Adolescent to Eat	1,045	68% (707)	13% (137)	19% (201)
Parent Restricts What Adolescent Eats	1,044	68% (706)	13% (140)	19% (198)
		Both Parents Endorse 0–4 Times	**Both Parents Endorse 5+ Times**	**Any Discordant**
Weekly Frequency of Family Meals	1,042	42% (439)	37% (380)	21% (223)
		Both Parents Endorse Rarely	**Both Parents Endorse Sometimes/Usually/Always**	**Any Discordant**
Frequency of Adolescent Media Use at Family Meals	940	41% (389)	38% (353)	21% (198)

[a] All values presented as raw % (n).

Table 3

Parent Concordance/Discordance on Characteristics of the Family Physical Activity Environment (n=1,052 pairs) within Sociodemographically Diverse Households[a]

		Parental Concordance			Parental Discordance
	N	Both Parents Endorse None	Both Parents Endorse ½–4 Hours	Both Parents Endorse 4+ Hours	Any Discordant
Frequency of Parent Engaging in Physical Activity with Child (hrs/wk)	1,029	16% (165)	46% (471)	2% (20)	36% (373)
Frequency of Parent Helping Child to be Physically Active (hrs/wk)	1,028	21% (212)	39% (400)	5% (53)	35% (363)
Frequency of Parent Watching TV/Movies with Child (hrs/wk)	1,030	3% (28)	63% (654)	7% (72)	27% (276)

[a] All value presented as raw %(n).

Table 4

Adolescent Eating and Weight Control Patterns by Parental (n=1,052 pairs) Concordance/Discordance on Familial and Parental Factors in the Home Eating Environment.

		Parental Concordance		Parental Discordance
Fruits & Vegetables (Adjusted Mean (SE) servings/day)[a]	**N[b]**	**Both Parents Endorse Disagree**	**Both Parents Endorse Agree**	**Any Discordant**
Importance of Family Meals[C]	838	2.52 (0.11)[A]	2.78 (0.12)[AB]	2.90 (0.14)[B]
Parent Sets Limits on Adolescent's Media Use During Family Meals[C]	810	2.33 (0.18)[A]	2.77 (0.09)[B]	2.80 (0.16)[AB]
Parent Pressures Adolescent to Eat[C]	867	2.67 (0.08)[A]	2.84 (0.20)[A]	2.70 (0.16)[A]
Parent Restricts What Adolescent Eats[C]	866	2.64 (0.08)[A]	3.00 (0.19)[A]	2.73 (0.16)[A]
		Both Parents Endorse Zero-Four Times	**Both Parents Endorse Five + Times**	**Any Discordant**
Weekly Frequency of Family Meals[C]	866	2.55 (0.11)[A]	2.89 (0.12)[B]	2.70 (0.15)[AB]
		Both Parents Endorse Never or Rarely	**Both Parents Endorse Sometimes/Usually/Always**	**Any Discordant**
Frequency of Adolescent Media Use at Family Meals[C]	783	2.89 (0.12)[B]	2.49 (0.13)[A]	2.74 (0.16)[AB]

Fast Food (Adjusted Mean (SE) times/wk)[d]		**Both Parents Endorse Disagree**	**Both Parents Endorse Agree**	**Any Discordant**
Importance of Family Meals[C]	914	1.58 (0.07)[B]	1.20 (0.09)[A]	1.33 (0.09)[A]
Parent Sets Limits on Adolescent's Media Use During Family Meals[C]	882	1.29 (0.12)[A]	1.27 (0.06)[A]	1.92 (0.11)[B]
Parent Pressures Adolescent to Eat[C]	946	1.34 (0.06)[A]	1.43 (0.14)[A]	1.49 (0.11)[A]
Parent Restricts What Adolescent Eats[C]	946	1.41 (0.06)[A]	1.32 (0.13)[A]	1.35 (0.11)[A]
		Both Parents Endorse Never-Four Times	**Both Parents Endorse Five+ Times**	**Any Discordant**
Weekly Frequency of Family Meals[C]	946	1.44 (0.07)[A]	1.32 (0.08)[A]	1.41 (0.10)[A]
		Both Parents Endorse Never or Rarely	**Both Parents Endorse Sometimes/Usually/Always**	**Any Discordant**
Frequency of Adolescent Media Use at Family Meals[C]	854	1.25 (0.08)[A]	1.55 (0.08)[B]	1.43 (0.11)[AB]

Unhealthy Weight Control Behaviors (Adjusted %(SE))[e]		**Both Parents Endorse Disagree**	**Both Parents Endorse Agree**	**Any Discordant %(n)**
Importance of Family Meals[C]	910	40% (2)[AB]	36% (3)[A]	44% (3)[B]
Parent Sets Limits on Adolescent's Media Use During Family Meals[C]	878	38% (4)[A]	41% (2)[A]	36% (4)[A]
Parent Pressures Adolescent to Eat[C]	942	42% (2)[A]	37% (4)[A]	39% (3)[A]

Unhealthy Weight Control Behaviors (Adjusted %(SE))[e]		Both Parents Endorse Disagree	Both Parents Endorse Agree	Any Discordant %(n)
Parent Restricts What Adolescent Eats[c]	942	36% (2)[B]	51% (4)[A]	47% (4)[A]
		Both Parents Endorse Zero-Four Times	**Both Parents Endorse Five + Times**	**Any Discordant**
Weekly Frequency of Family Meals[c]	942	42% (2)[A]	34% (3)[B]	47% (3)[A]
		Both Parents Endorse Never or Rarely	**Both Parents Endorse Sometimes/Usually/Always**	**Any Discordant**
Frequency of Adolescent Media Use at Family Meals[c]	850	38% (3)[A]	36% (3)[A]	44% (4)[A]

[a] Values presented are adjusted means and standard errors (SE) for fruit and vegetable servings/day; Models adjusted for Child's age (continuous), race/ethnicity (categorical), sex (categorical), SES (categorical), and both Parent's BMI (continuous).

[b] N represents total in final model without missing information on outcome, exposure, and confounders.

[c] Means sharing a letter (i.e., A, B, C) in the group label are not significantly different at the $p < 0.05$ level.

[d] Values presented are adjusted means (SE) for fast food frequency/week; Models adjusted for Child's age (continuous), race/ethnicity (categorical), sex (categorical), SES (categorical), and both Parent's BMI (continuous).

[e] Values are presented are adjusted percents (SE) for unhealthy weight control behaviors; Models adjusted for Child's age (continuous), race/ethnicity (categorical), sex (categorical), SES (categorical), and both Parent's BMI (continuous).

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Table 5

Adolescent mean BMI-percentile by Parental (n=1,052 pairs) Concordance/Discordance on Familial and Parental Factors in Diverse Home Environments.

		Parental Concordance			Parental Discordance
BMI Percentile (Adjusted Mean (SE))[a]	**N[b]**	**Both Parents Endorse Disagree**	**Both Parents Endorse Agree**		**Any Discordant**
Importance of Family Meals[c]	914	0.67 (0.01)[A]	0.69 (0.02)[A]		0.65 (0.02)[A]
Parent Sets Limits on Adolescent's Media Use During Family Meals[c]	882	0.70 (0.02)[A]	0.67 (0.01)[A]		0.62(0.02)[B]
Parent Pressures Adolescent to Eat[c]	946	0.69 (0.01)[A]	0.63 (0.03)[B]		0.61 (0.02)[B]
Parent Restricts What Adolescent Eats[c]	946	0.65 (0.01)[A]	0.72 (0.02)[B]		0.72 (0.02)[B]
		Both Parents Endorse 0–4 Times	**Both Parents Endorse 5+ Times**		**Any Discordant**
Weekly Frequency of Family Meals[c]	946	0.67 (0.01)[A]	0.67 (0.01)[A]		0.68 (0.02)[A]
		Both Parents Endorse Rarely	**Both Parents Endorse Sometimes/Usually/Always**		**Any Discordant**
Frequency of Adolescent Media Use at Family Meals[c]	854	0.67(0.01)[A]	0.66 (0.02)[A]		0.67 (0.02)[A]
		Both Parents Endorse None	**Both Parents Endorse ½–4 Hours**	**Both Parents Endorse 4+ Hours**	**Any Discordant**
Weekly Frequency of Parent Engaging in Physical Activity with Child (hrs/wk)[c]	946	0.68 (0.02)[A]	0.66 (0.01)[A]	0.68 (0.06)[A]	0.67 (0.01)[A]
Weekly Frequency of Parent Helping Child to be Physically Active (hrs/wk)[c]	945	0.67 (0.02)[A]	0.66 (0.01)[A]	0.70 (0.04)[A]	0.67 (0.01)[A]
Weekly Frequency of Parent Watching TV/Movies with Child (hrs/wk)[c]	945	0.69 (0.06)[A]	0.66 (0.01)[A]	0.73 (0.03)[A]	0.67 (0.02)[A]

[a] Values presented are adjusted means and standard errors (SE) for BMI percentile; Models adjusted for Child's age (continuous), race/ethnicity (categorical), sex (categorical), SES (categorical), and both Parent's BMI (continuous).

[b] N represents total in final model without missing information on outcome, exposure, and confounders.

[c] Means sharing a letter (i.e., A, B) in the group label are not significantly different at the $p < 0.05$ level.

Table 6

Adolescent mean BMI-percentile by Parental (n=1,052 pairs) Concordance/Discordance on Familial and Parental Factors in Diverse Home Environments.

		Parental Concordance			Parental Discordance
BMI Percentile (Adjusted Mean (SE))[a]	**N[b]**	**Both Parents Endorse Disagree**	**Both Parents Endorse Agree**		**Any Discordant**
Importance of Family Meals[C]	914	0.67 (0.01)[A]	0.69 (0.02)[A]		0.65 (0.02)[A]
Parent Sets Limits on Adolescent's Media Use During Family Meals[C]	882	0.70 (0.02)[A]	0.67 (0.01)[A]		0.62(0.02)[B]
Parent Pressures Adolescent to Eat[C]	946	0.69 (0.01)[B]	0.63 (0.03)[A]		0.61 (0.02)[A]
Parent Restricts What Adolescent Eats[C]	946	0.65 (0.01)[B]	0.72 (0.02)[A]		0.72 (0.02)[A]
		Both Parents Endorse 0–4 Times	**Both Parents Endorse 5+ Times**		**Any Discordant**
Weekly Frequency of Family Meals[C]	946	0.67 (0.01)[A]	0.67 (0.01)[A]		0.68 (0.02)[A]
		Both Parents Endorse Rarely	**Both Parents Endorse Sometimes/Usually/Always**		**Any Discordant**
Frequency of Adolescent Media Use at Family Meals[C]	854	0.67(0.01)[A]	0.66 (0.02)[A]		0.67 (0.02)[A]
		Both Parents Endorse None	**Both Parents Endorse ½–4 Hours**	**Both Parents Endorse 4+ Hours**	**Any Discordant**
Weekly Frequency of Parent Engaging in Physical Activity with Child (hrs/wk)[C]	946	0.68 (0.02)[A]	0.66 (0.01)[A]	0.68 (0.06)[A]	0.67 (0.01)[A]
Weekly Frequency of Parent Helping Child to be Physically Active (hrs/wk)[C]	945	0.67 (0.02)[A]	0.66 (0.01)[A]	0.70 (0.04)[A]	0.67 (0.01)[A]
Weekly Frequency of Parent Watching TV/Movies with Child (hrs/wk)[C]	945	0.69 (0.06)[A]	0.66 (0.01)[A]	0.73 (0.03)[A]	0.67 (0.02)[A]

[a] Values presented are adjusted means and standard errors (SE) for BMI percentile; Models adjusted for Child's age (continuous), race/ethnicity (categorical), sex (categorical), SES (categorical), and both Parent's BMI (continuous).

[b] N represents total in final model without missing information on outcome, exposure, and confounders.

[c] Means sharing a letter (i.e., A, B, C) in the group label are not significantly different at the $p < 0.05$ level.